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The Commonwealth of Massachusetts

Department of Environmental Quality Engineering
Metropolitan Boston - Northeast Region
5 Commonwealth Avenue
Woburn, Massachusetts 01801

S. RUSSELL SYLVA
Commissioner

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DEQE
HAZARDOUS WASTE

MEMORANDUM

TO: Harish Panchal, DHW, Boston

THRU: Steve Johnson, DHW, NERO SJ

FROM: Denise Kokaras, DHW, NERO DK

DATE: September 29, 1988

SUBJECT: NORTH ANDOVER - AT&T, Merrimack Valley Works
1600 Osgood Avenue
EPA ID# MAD001005370 DEQE Case No. 3-174

Introduction

This Preliminary Assessment was completed on AT&T's Merrimack Valley Works, located at 1600 Osgood Ave., North Andover, MA. Studies to date have detected the presence of chlorinated and nonchlorinated solvents in numerous on-site wells.

This site is located in the South Groveland Quadrangle (see Appendix I, p. 1).

History of Site

According to AT&T's consultant, Camp, Dresser & McKee (CDM) the AT&T Merrimack Valley Works facility (AT&T) has manufactured microwave transmission equipment at its present location since 1956. The plant is located on 169 acres in an industrial section of North Andover and is separated from the Merrimack River by a Boston & Maine Railroad (B&M) easement. The City of Methuen is located directly across the river from the plant (see Appendix I, p. 1). Industries in the vicinity of the site include the Lawrence Municipal Airport, the North Andover Landfill, a Borden Chemical Plant, and the Signal-Resco Incinerator facility.

Currently, AT&T employs 7500 people in their manufacturing operations. An additional 1200 employees work at Bell Laboratories, an AT&T subsidiary, at the same location.

Description of Hazardous Conditions, Incidents, Permit Violations

AT&T uses various industrial solvents, etchants, and other chemicals in their manufacturing and assembly processes. AT&T is listed as a generator of hazardous waste (RCRA Generator No. MAD001005370). The following organic materials were typically stored in the past in both underground storage tanks and barrels at the site:

Trichloroethylene	Ammonia Etchant
Toluene	Waste Solvents
Acetone	Waste Acetone & Water Mixture
Varsol	Spent Ammonia Etchant
Methyl Chloroform	Spent Copper Electroplating Solution
Gasoline	Spent Brulin (etchant)

As part of AT&T's ongoing facility modernization operations, below ground storage tanks and associated piping were replaced in 1986 with above ground storage tanks for easier maintenance and monitoring.

On January 1986, AT&T engineers discovered low levels of chlorinated solvents and petroleum hydrocarbons in their production well water. EPA Methods 601, 602 and 624 (see Appendix II, pp. 2-10 for C.T. Main testing results) indicated that production wells 1 and 3 were contaminated with Volatile Organic Compounds (VOCs). Subsequently, CDM was hired by AT&T to investigate the extent of the contamination at the site and to aid in the removal of underground storage tanks from the site.

CDM, in their report entitled "Merrimack Valley Works, Phase II Hydrogeologic Investigation, Final Report, February 1988", identified several potential sources for this groundwater contamination. The following areas were all shown to have VOC soil contamination (see Appendix III, pp. 11-13):

(1) The Solvent tank farm area which contains nine underground storage tanks. These tanks were removed in 1986-1987.

(2) The Waste Solvent tank which was removed in 1986.

(3) The Waste Acetone tank, which was cleaned, filled with grout, and abandoned in place in 1986. This tank could not be removed due to its proximity to underground utility lines.

(4) The Barrel Pad area, which consisted of an underground waste solvent tank and an above ground barrel storage facility. This facility was removed in 1985.

CDM determined, during their hydrogeologic investigation, that the most significant source of contamination appeared to be the main solvent tank farm area. High levels of VOCs - up to 300 milligrams per liter in total (EPA Method 8240)-were detected in a nearby monitoring well water sample (see Appendix IV, p. 14). Lower levels of VOC contamination were discovered in the vicinity of the waste solvent tank and the waste acetone tank. Groundwater contamination was also detected in the vicinity of the barrel pad area.

Underground Storage Tank Excavations and Closures:

As part of AT&T's tank decommissioning plan, seventeen underground storage tanks were removed and one tank was permanently closed (see Appendix V, p. 15). CDM assisted in the decommissioning of thirteen of these tanks. Their activities are described below:

Upon removal of the 5,000 gallon gasoline tank and the waste oil tank, organic vapor screening of soils in the excavation did not reveal the presence of VOCs. This was confirmed by CDM's laboratory analysis of soil samples using EPA Method 8240.

Due to the proximity of underground piping near the 7500 gallon waste acetone tank, this tank was abandoned in place (with the approval of the North Andover Fire Marshall).

All nine underground solvent tanks and piping in the tank farm area were removed. Soils unearthed during the excavation were also screened for VOCs with an HNU Photoionization Detector (equipped with an 11.7 ev lamp). As required by DEQE, soils registering less than 25 parts per million (ppm-volume per volume headspace as benzene) were reserved for excavation backfill. Soils registering greater than 25 ppm were temporarily stored on a 20 cubic yard container pending laboratory analysis. Composite samples from both soil piles were analyzed at CDM's Boston Laboratory using EPA Method 8240. Soils containing VOCs in concentrations greater than 1 ppm were taken off-site by a licensed hazardous waste hauler to an approved disposal facility. Of the 570 cubic yards of soil unearthed in the tank farm excavation area, approximately 300 cubic yards were transported off-site by Suffolk Services, Inc. to SCA Chemical Services in Model City, New York.

Contaminated water encountered during dewatering activities in the solvent tank farm area was treated with an air stripper which was installed on site. Effluent from the air stripper was discharged to AT&T's Industrial Wastewater Treatment Plant (IWTP) which discharges to the Merrimack River through outfall number OOIA, as part of AT&T's National Pollutant Discharge Elimination System (NPDES) permit (permit MA #0001261).

Groundwater remediation in the tank farm area commenced on February 23, 1987 and continued through May 28, 1987. This short term measure was conducted in order to expedite the removal and treatment of groundwater in the vicinity of the tank farm excavation. At its conclusion, nearly 50,000 gallons of groundwater were recovered and treated. Samples of air stripper influent and effluent (prior to discharge at AT&T's IWTP) were collected on a weekly basis for analysis using EPA Method 624. In summary, Total Toxic Organics (TTO) in the effluent discharge (as expressed by EPA Method 624 since VOCs were the only contaminants present) totalled below 100 ppb for all but one sample. For this one sample, taken March 12, 1987, the results indicated less than 300 ppb TTO, well below the limit of 2130 ppb specified in the NPDES outfall permit.

As part of their Phase I hydrogeologic investigation, CDM installed 21 deep and shallow monitoring wells (see Appendix VI, p. 16, and Appendix VII, p. 17 for monitoring well locations, boring logs, and sampling results). The highest level of VOCs was detected on May 1987 in well MW-25 located near the solvent tank farm area. A total of 208,700 ppb VOCs was detected in this well. The following specific contaminants were found in this well:

47,200 ppb 1,1,1-Trichloroethane
64,330 ppb Trichloroethylene
94,170 ppb Toluene

Overall, VOCs were found in 18 of the 21 wells, ranging in concentrations from 19 ppb to 208,706 ppb total VOCs.

Geologic and Hydrogeologic Information

According to CDM, Merrimack Valley Works property is relatively flat. Drumlins and bedrock-dominated uplands border the site to the east and south.

Based on observations of split spoon boring samples, CDM determined that there were five basic stratigraphic units present at the site: (see Appendix VIII, pp. 18-23)

- A fine silty sand layer extends from the ground surface to 20 to 40 feet below grade at the site.

- Glacial till lies directly above bedrock, and is either exposed at the surface or is covered by a fine sand layer.

- A narrow band of coarse sand and gravel extends non-continuously across the site, and is believed to be a buried post-glacial channel. It is located 60 to 90 feet below grade and is approximately 15 to 30 feet thick above the bedrock surface. This buried channel is highly transmissive.

- A relatively impermeable but noncontinuous layer of silts and clays, of varying thickness, exist across the site. These silty and sandy deposits lie directly below the fine sand and above either the buried channel or bedrock.

- Weathered and fractured silt stone and sandstone bedrock exists throughout the site.

Groundwater was observed to be present in the shallow overburden system, in the buried channel cover, and in the bedrock. CDM observed that the direction of groundwater flow across the site is generally toward the Merrimack River in both the shallow and deep aquifer systems (see Appendix IX, p. 24, 25). They also calculated that horizontal groundwater gradients across the site are approximately 1% (i.e. a 1 foot drop per 100 feet of horizontal distance) in each of the three water bearing formations. They also determined that there are strong vertical gradients across the site, ranging from an 11% downward gradient at MW-3 to a 5% upward gradient at MW-6 (see Appendix X, p. 26).

Overall, based on their field data, CDM concluded that the Merrimack River is a point of groundwater discharge, even for the deep aquifer system. In CDM's opinion, the downward gradient at MW-3 didn't necessarily mean that a significant quantity of water was moving downward at this location since a thirty foot clay layer separates the surficial sand aquifer from the buried channel. In CDM's opinion, this clay lens would most likely inhibit strong vertical flow.

To further define communication between the three principal units, CDM analyzed groundwater in all monitoring and production wells to determine their anion concentrations (see Appendix XI, p. 27).

As a result of this sampling, CDM obtained the following Chloride distribution patterns: chloride concentrations measured in the shallow sand formation were, on average, 100 times higher than chloride concentrations in the weathered bedrock, and approximately 4 times higher than chloride concentrations in the buried channel. In CDM's opinion, the most likely source of the chloride in the sand unit is the road salt used to melt snow and ice during the winter. CDM used this road salt infiltration analysis of groundwater much like a chemical tracer since groundwater typically does not contain high chloride concentrations.

Appendix XI shows the ranges and average chloride concentrations which were measured in the shallow sand unit, the buried channel and the bedrock. CDM determined that the bedrock is essentially free of chlorides (except at monitoring wells MW-10D and MW-5D), while the buried channel contains chloride concentrations approaching those of the shallow sand unit. In CDM's opinion, relatively high chloride levels in the buried channel imply that groundwater flows from the shallow sand unit to the buried channel. This is supported by the presence of downward hydraulic gradients over much of the site. CDM believes low chloride concentrations in the bedrock imply that:

1. The bedrock does not receive water from the buried channel or

2. That the bedrock has low vertical permeability or

3. Till above the bedrock inhibits vertical flow.

A seven day pump test using rising head and constant head recovery tests were conducted on monitoring well MW-11D from November 10-17, 1987 in order to investigate the magnitude and location of hydraulic connections between the shallow sand aquifer and the deep aquifers. MW-11D was selected because it contained no VOCs when last sampled in June of 1987.

This well was pumped at an average rate of 63 gallons per minute (GPM). However, it was not possible for CDM to stop or limit pumping from the AT&T production wells. AT&T operators, however, did attempt to maintain a consistent pumping rate. CDM gauged water levels in all monitoring and production wells eight days prior to the start of the pump test in order to determine the range of the normal fluctuations. In this way, CDM determined that variations in piezometric head of up to one half foot could be attributed to normal operations of the production wells, fluctuations in water levels in the Merrimack River, etc.

Drawdown from this pump test ranged from 4 feet at well MW-9D to .9 feet at MW-5D at the deeper wells (see Appendix XII, pp. 28-30). All shallow wells showed .5 feet or less of drawdown initially. However, no shallow wells registered more than .1 feet of drawdown after 2 days of pumping. CDM believed this indicated that the deep aquifer was confined but subject to some leakage.

CDM observed that drawdown in the deep aquifer was greater along an axis parallel to the buried channel, supporting their hypothesis that the channel is a narrow, transmissive band. CDM observed that wells in the weathered bedrock also showed this preferential drawdown pattern, indicating that this water flowed along fractures parallel to the channel.

Overall, the site receives surface runoff from a large catchment area that includes drainage from Lake Cochichewick. Onsite streams and storm drains ultimately discharge to the Merrimack River.

Routes of Contamination

CDM detected VOCs in 18 of the 21 onsite monitoring wells VOC contamination was present in both the shallow and deep aquifer systems. CDM did not detect VOCs in the stream that runs south of the facility or in the Merrimack River or river sediments, nor in any of the onsite storm drains they sampled.

Based on field data and on finite element modeling of the three-dimensional groundwater flow across the site, CDM believes that the contaminant plume is preferentially migrating along the transmissive buried channel towards the river. Contaminant flow in the weathered and fractured bedrock also shows preferential migration along a northwest-southeast axis (perpendicular to the river). There is also vertical groundwater flow between the shallow and deep aquifer systems.

Affected Population

Groundwater at the site is contaminated with chlorinated aliphatics and petroleum aromatics. Groundwater discharges to the northwest into the Merrimack River which borders the site. The nearest public water supply is Lake Cochichewick, which is an active water supply for the Town of North Andover. This water supply is located 1 mile south of the site (hydraulically upstream). A secondary pumping station on the Merrimack River, operated by the City of Lawrence, is also located one mile to the southwest of the site (hydraulically upgradient). Chadwick Pond, which is an active water supply for the Town of Haverhill, is located approximately 2 miles northeast of the site. There are no other public water supplies within 4 miles of the site.

The possibility of volatilization of VOCs into nearby enclosures appears minimal since the contaminant plume is located to the north-northwest of the facility and is migrating in a northerly direction towards the river.

Recommendations

The contaminant conditions discussed above constitute a release of hazardous materials under Massachusetts General Law Ch.21E and are being regulated accordingly. To date, CDM has removed the bulk of contaminated soil and all historic underground storage tanks and piping have been removed, or capped and filled. The two existing gasoline replacement tanks are doublewalled UST's equipped with leak detection systems.

AT&T's consultant, CDM, has received approval from DEQE to activate monitoring wells MW-6D and MW-10D as two groundwater extraction wells (see Appendix IX, pp. 24, 25). Influent groundwater will be processed and treated by an airstripper tower. CDM is currently obtaining a formal modification of AT&T's NPDES permit in order to incorporate the discharge of treated water to their Industrial Wastewater Treatment Plant.

It is anticipated that the two groundwater extraction wells will remove most of the contaminated water from both the deep and shallow aquifer system. CDM predicted that the capture zone of this extraction system will encompass all suspected source areas. Three production wells, downgradient of the extraction network, will also be monitored using EPA Method 624 and will serve as a further capture point for any contamination which has migrated past the proposed recovery system.

DEQE expects that this groundwater extraction and treatment system will be implemented by the Fall of 1988. As a result, DEQE recommends a low priority for a site inspection under CERCLA.

DK/ae

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MA	MAD001005370

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
AT&T Merrimack Valley Works	1600 Osgood Street

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
North Andover	MA	01845	Essex	009	06

09 COORDINATES LATITUDE 42 4 3 50 . 0 LONGITUDE 0 71 07 00 . 0

10 DIRECTIONS TO SITE (Starting from nearest public road)

From Boston, take Route 93 North to Route 125 North. At the Lawrence Airport, Route 125 becomes Osgood Street. The site is located on your left at 1600 Osgood Street.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
AT&T	1600 Osgood Ave.

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
North Andover	MA	01845	(617) 681-2650

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
			( )

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL: ______ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER: ______ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☒ A. RCRA 3001 DATE RECEIVED: 8 / 18 / 80 (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: __ / __ / __ (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☒ YES DATE 6 / 10 / 87 (MONTH DAY YEAR)
☐ NO

BY (Check all that apply) ☐ A. EPA ☐ B. EPA CONTRACTOR ☒ C. STATE ☐ D. OTHER CONTRACTOR ☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: ______ (Specify)

CONTRACTOR NAME(S): ______

02 SITE STATUS (Check one)

☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN

03 YEARS OF OPERATION 1956 (BEGINNING YEAR) | ______ (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Chlorinated and nonchlorinated solvents have been detected in numerous on-site monitoring wells.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

VOC contaminated groundwater is migrating towards the nearby Merrimack River.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☒ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
Denise Kokaras	DEQE	(617) 935-2160

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Denise Kokaras	DEQE	DHW/SAC	(617) 935-2160	9 / 26 / 88 (MONTH DAY YEAR)

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POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MA	MAD001005370

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

☐ A SOLID ☐ E SLURRY
☐ B POWDER, FINES ☐ F LIQUID
☐ C SLUDGE ☐ G GAS
☐ D OTHER ________ (Specify)

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS ________
CUBIC YARDS ________
NO. OF DRUMS ________

03 WASTE CHARACTERISTICS (Check all that apply)

☐ A TOXIC ☐ E SOLUBLE X I HIGHLY VOLATILE
☐ B CORROSIVE ☐ F INFECTIOUS ☐ J EXPLOSIVE
☐ C RADIOACTIVE ☐ G FLAMMABLE ☐ K REACTIVE
☐ D PERSISTENT ☐ H IGNITABLE ☐ L INCOMPATIBLE
☐ M NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	1,1,1-Trichloroethane	71-55-6		47,200	ppb
SOL	Trichloroepthylene	79-01-6		67,330	"
SOL	1,1- Dichloroethylene			73	"
SOL	1,1-dichloroethane	75-34-3		218	"
SOL	Trans-1,2-Dichloroethylene	156-50-5		355	"
SOL	Chloroform	47-66-5	UST	30	"
SOL	1,1,2,2-Tetrachloroethylene	127-18-4		30	"
SOL	Toluene	108-88-3	UST	94,170	"

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Camp, Dresser & McKee (CDM) "Phase I Hydrogeologic Investigation of the AT&T Merrimack Valley Works, North Andover, MA, November, 1986".
CDM, "Final Report Underground Storage Tank Removal Program at AT&T Merrimack Valley Works, North Andover, MA, March 1987".
CDM, "AT&T Merrimack Valley Works Phase II Hydrogeologic Investigation, Final Report and Appendices, February 1988".
Northeast Regional Files.

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MA	MAD001005370

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☒ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: 1/16/86) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

Groundwater at the site is contaminated with chlorinated and nonchlorinated solvents.

01 ☐ B. SURFACE WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

To date, surface water and sediment samples taken from the Merrimack River did not reveal the presence of VOCs, though there is the potential for such contamination.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: ______) ☒ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

There is the potential for volatilization of VOCs into enclosed spaces. However, it appears unlikely since the contaminant plume is largely downgradient of the facility buildings.

01 ☐ D. FIRE/EXPLOSIVE CONDITIONS — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: N/A — 04 NARRATIVE DESCRIPTION

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: N/A — 04 NARRATIVE DESCRIPTION

01 ☒ F. CONTAMINATION OF SOIL — 02 ☐ OBSERVED (DATE: 5/1/86) ☐ POTENTIAL ☐ ALLEGED

03 AREA POTENTIALLY AFFECTED: ______ (Acres) — 04 NARRATIVE DESCRIPTION

Soil in the former solvent tank farm area was observed to be contaminated. The bulk of this contaminated soil has been removed off-site to an appropriate hazardous waste landfill.

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: N/A? — 04 NARRATIVE DESCRIPTION

01 ☐ H. WORKER EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED

03 WORKERS POTENTIALLY AFFECTED: N/A — 04 NARRATIVE DESCRIPTION

01 ☐ I. POPULATION EXPOSURE/INJURY — 02 ☐ OBSERVED (DATE: 5/1/86) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: ______ — 04 NARRATIVE DESCRIPTION

There is VOC contamination in soils and groundwater at the site.

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POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MA	MAD001005370

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J. DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

N/A

01 ☐ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/runoff/standing liquids/leaking drums) — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: N/A
04 NARRATIVE DESCRIPTION

01 ☐ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: ______) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

N/A

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

N/A

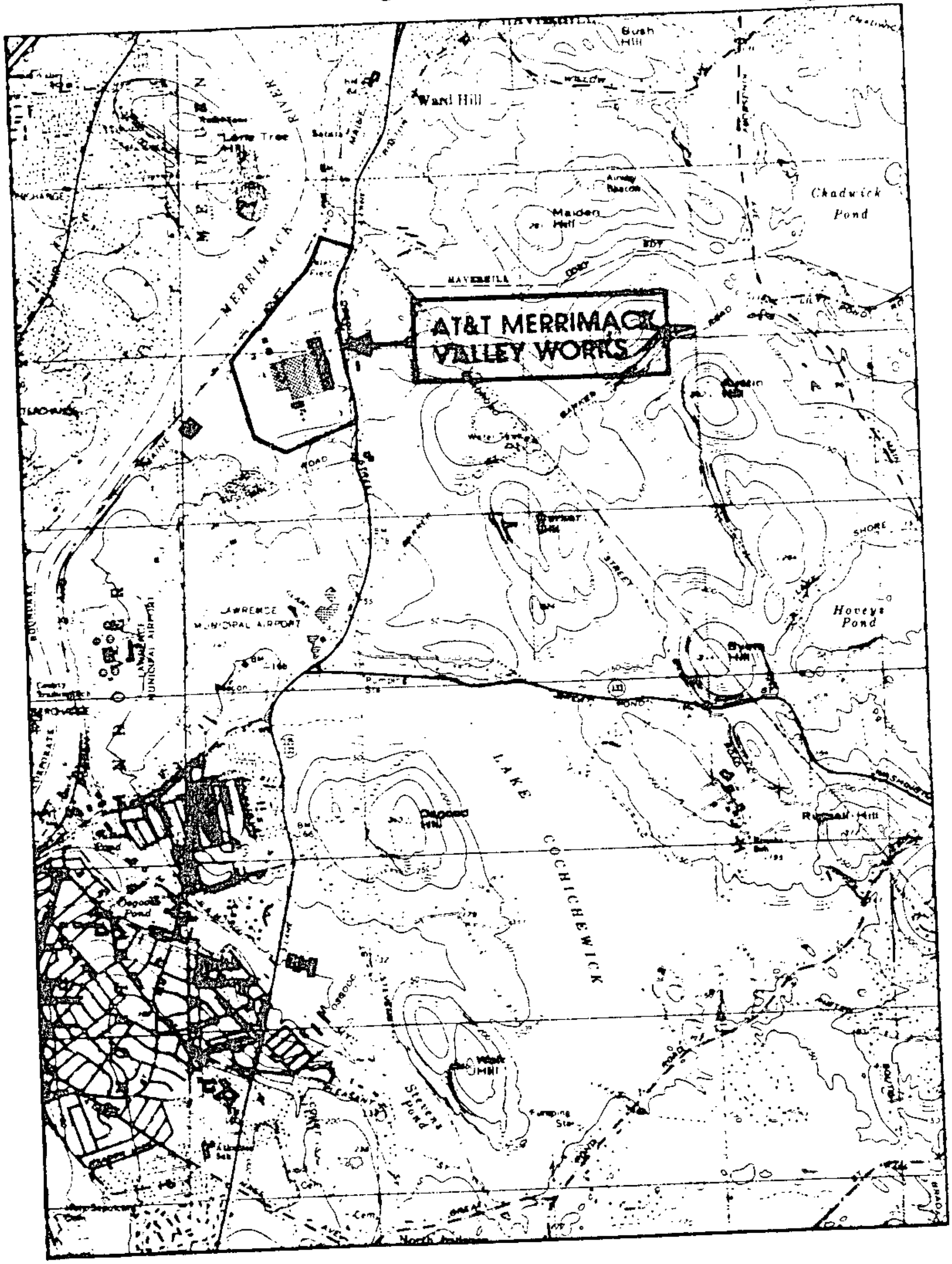
III. TOTAL POPULATION POTENTIALLY AFFECTED: ______

IV. COMMENTS

DEQE has approved a groundwater recovery and treatment system for the site. The bulk of contaminated soils have been removed along with the majority of AT&T's underground storage tanks at the site. As a result, DEQE recommends a low priority for a Site Investigation under CERCLA.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

(see Part 2, VI for citations)



AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC
INVESTIGATION

Camp Dresser & McKee Inc.

FIGURE 1-1
SITE LOCATION

TABLE 2.2

CONCENTRATIONS OF VOLATILE ORGANICS
IN INDIVIDUAL PRODUCTION WELL SAMPLES

	Compound	Date of Sample 1/18/86	1/19/86	1/20/86	1/21/86	1/22/86
Production Well 1 (in use at time of sampling)	1,1,1 Trichloroethane	29	29	36	37	33
	Trichlorethene	97	113	119	126	119
	Trans-1,2-Dichloro-ethene	31	31	33	35	33
	1,1-Dichloroethene	3	3	–	–	–
	1,1-Dichloroethane	–	1	–	–	4
	1,2-Dichloroethane	–	–	–	–	–
	1,1,2,2-Tetrachloro-ethene	–	–	–	–	–
	Chloroform	–	–	–	–	–
	Tetrachloroethene	1	1	2	1	–
	Methylene Chloride	–	1	–	–	–
	Vinyl Chloride	–	–	15*	25*	–
Production Well 2 (in use)	None Detected					
Production Well 3 (not in use at time of sampling)	1,1,1 Trichloroethane	11	–	18	18	28
	Trichlorethene	139	–	106	93	96
	Trans-1,2-Dichloro-ethene	5	4	4	4	4
	1,1-Dichloroethene	–	–	20	21	26
	1,1-Dichloroethane	7	10	14	14	–
	1,2-Dichloroethane	–	–	–	–	–
	1,1,2,2-Tetrachloro-ethene	–	–	–	–	–
	Chloroform	–	–	–	–	–
	Tetrachloroethene	–	–	2	–	2
	Methylene Chloride	–	–	–	–	–

*Results of Method 624. All other results are from method 601/602.

WAT .TROL LAB AT & T AT & T AN

SAMPLE DATE	MICROBIOLOGY BACT	FUNGAL	PH	TURB	COND	P ALK	M ALK	MINERALS SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	ORGANICS TOC	VOA	VOLATILE AMINES	PETROL. HYDROCARBONS
CARBON A IN 1/14/86																	1.9			
CARBON B IN 1/14/86																	1.7			
CARBON C IN 1/14/86																	1.6			
CARBON D IN 1/14/86																	1.6			
CARBON A OUT 1/14/86																	(1.0			
CARBON B OUT 1/14/86																	(1.0			
CARBON C OUT 1/14/86																	(1.0			
CARBON D OUT 1/14/86																	(1.0			
EXCHANGE BEFORE 1/14/86																			NONE DETECTED	
EXCHANGE AFTER 1/14/86																			NONE DETECTED	
WELL 3 BEFORE FLUSH 1/14/86										16.5	0.70	100						624 N.D.		N.D.
WELL 3 1/12/86										0.03	0.14	18								N.D.
WELL 3 AFTER FLUSH 1/14/86										0.09	0.22	18						624 N.D.		

WATER CONTROL LA AT & T ANALYSIS

SAMPLE DATE	MICROBIOLOGY BACT	FUNGAL	PH	TURB	COND	P ALK	M ALK	MINERALS SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	ORGANICS TOC	VOA
INCOMING WATER 1/16	0	PENDING	6.2	0.1	400	0	34	52	113	0.02	0.73	14	18	24	4.4	(0.07	1.1	
AFTER DEGASIFIER 1/16	0	PENDING																
R/O #? FEED			6.4	0.0	?50	0	17	34	70	0.02	0.00	10	?2	16	3.2	(0.07	(.01	UG/L

APPENDIX II (CONTINUED)

Page 3

	BACT FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA
CARBON 1/16																1.4	
CARBON A OUT 1/16																<0.1	

	BACT FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA
INCOMING WATER 1/17	70 PENDING	6.0	0.1	400	0	34	49	114	0.02	0.56	18	22	25.0	4.5	0.0	1.1	601 UG/L 1,1,1TRICHLOROETHANE- 19 TRICHLOROETHENE 133 TRANS12DCIHLOROETHENE 14 1,1DICHLOROETHENE 7
AFTER DEGASIFIER 1/17	52 PENDING																
R/O 27 FEED 1/17		6.3	0.0	380	0	17	41	84	0.00	0.00	12	32	15.0	3.0	0.0		601 UG/L 1,1,1TRICHLOROETHANE 6
R/O 27 REJECT 1/17	>2000 PENDING	6.2	0.0	380	0	17	54	102	0.00	0.00	16	48	20.0	3.5	0.0		
R/O 27 PRODUCT 1/17	880 PENDING																
CARBON A IN 1/17																1.3	
CARBON B OUT 1/17																<1	

	BACT FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA
INCOMING WATER 1/18	60 PENDING	6.1	0.1	210	0	17	31	53	0.01	0.88	12	16	1.5	2.5	0.0	1.3	601/602 UG/L TRANS12DICHLOROETHENE 22 1,1DICHLOROETHENE 3 METHYLENE CHLORIDE 1 TETRACHLORETHENE 1 1,1,1TRICHLOROETHANE 27 TRICHLOROETHENE 78
AFTER DEGASIFIER 1/18	0 PENDING																
R/O 29 FEED 1/18		6.4	0.0	210	0	17	34	63	0.00	0.00	10	10	10.0	2.0	0.0		601/602 UG/L 624 625 1,1,1TRICHLOROETHANE 6 — N.D. N.D.
R/O 29 REJECT 1/18	1300 PENDING	6.7	0.0	950	0	34	166	291	0.00	0.00	40	52	4.5	8.0	0.0		
R/O 29 PRODUCT 1/18	4 PENDING																
CITY 1/18		7.3	0.3	110	0	17	11	22	0.04	0.01	0.6	12	15.0	1.5	0.04		601/602 UG/L BROMODICHLOROMETHANE 16 CHLOROFORM 108 [illegible]

APPENDIX II (CONTINUED)

R/O F STAGE 1/18			6.5	0.0	475	0	17	78	[illegible]	0.00	0.00	29	28	25	4.0	0.0		
WELL 1 1/18			6.0	0.1	400	0	34	64	115	0.00	0.72	14	23	25.0	3.5	0.0	1.2	601/602 UG/L TRANS12DICHLOROETHENE 31 1,1DICHLOROETHENE 3 TETRACHLOROETHENE 1 1,1,1TRICHLOROETHANE 29 TRICHLOROETHENE 97
WELL 2 1/18			6.5	0.2	150	0	34	18	32	0.00	1.00	10	14	15.0	2.0	0.0	1.2	601/602 UG/L NONE DETECTED
WELL 3 1/18			6.3	0.4	425	0	51	50	111	0.06	0.07	21	24	40.0	7.0	0.0	(1	601/602 UG/L 1,1DICHLOROETHANE 7 TRANS12DICHLOROETHENE 5 1,1DICHLOROETHANE 9 1,1,1TRICHLOROETHANE 11 TRICHLOROETHENE 139
CARBON A IN 1/18																	1.3	
CARBON B OUT 1/18																	11	625 N.D.

	BACT	FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA
INCOMING WATER 1/19	0	PENDING	6.0	0.0	400	60	34	65	124	0.00	0.78	14	22	25.0	3.5	0.0	1.2	601/602 UG/L 1,1DICHLOROETHANE 1 TRANS12DICHLOROETHENE 30 1,1DICHLOROETHENE 4 METHYLENECHLORIDE 1 1,1,1TRICHLOROETHANE 34 TRICHLOROETHENE 117
AFTER DEGASIFIER 1/19	3	PENDING																
R/O 2B FEED 1/19			6.4	0.0	200	0	17	31	58	0.00	0.00	9	12	15.0	2.0	0.0		
R/O 2B REJECT 1/19	700		6.6	0.0	675	0	34	100	195	0.00	0.00	27	48	45.0	6.0	0.0		601/602 UG/L 1,1,1TRICHLOROETHANE 6 624 N.D. 625 N.D.
WELL 1 1/19			6.0	0.0	450	0	34	77	130	0.00	0.60	16	21	30.0	4.0	0.0	1.4	601/602 UG/L 1,1DICHLOROETHANE 1 TRANS12DICHLOROETHENE 31 1,1DICHLOROETHENE 3 METHYLENE CHLORIDE 1 TETRACHLOROETHENE 1 1,1,1TRICHLOROETHANE 29 TRICHLORETHENE 113
WELL 2 1/19			6.4	0.0	150	0	34	18	31	0.00	1.06	10	14	15.0	2.0	0.02	1.6	601/602 UG/L NONE DETECTED
WELL 3 1/19			6.2	0.3	425	0	51	48	106	0.06	0.07	23	28	40.0	7.0	0.0	(1	601/602 UG/L 1,1DICHLOROETHANE 10 TRANS12DICHLOROETHENE 4

	BACT FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA			
							17		0.06		0.1	12		1.5	14		1/602	UG/L		
																	[illegible]ODICH[illegible]HANE	[illegible]		
																	CHLOROFORM	117		
																	METHYLENE CHLORIDE	5		
R/O 28 PERMEATE 1/19		6.2	0.2	25	0	17	4	7	0.00	0.00	0.5	<1	1.7	0.2	0.0					
R/O 28 REJECT STAGE 1 1/19		6.6	0.0	400	0	17	60	116	0.00	0.00	17	30	30.0	3.5	0.0					
R/O 28 PRODUCT 1/19	630																			
CARBON C IN 1/19																1.3				625 N.D.
CARBON C OUT 1/19																<1				625 N.D.
INCOMING WATER 1/20	150	5.9	0.0	425	0	34	73	120	0.02	0.06	14	21	30.0	3.5	0.0	1.3	601/602	UG/L		
																	1,1DICHLOROETHANE	3		
																	TRANS12DICHLOROETHENE	24		
																	1,1DICHLOROETHENE	3		
																	1,1,1TRICHLOROETHANE	20		
																	TRICHLOROETHENE	91		
R/O 30 FEED 1/20		6.4	0.0	225	0	17	33	60	0.00	0.00	10	20	15.0	2.0	0.0		601/602 NONE DETECTED	UG/L	624 N.D.	625 N.D.
R/O 30 REJECT 1/20	940	6.7	0.0	750	0	34	100	220	0.00	0.00	20	70	55.0	7.0	0.0					
WELL 3 1/20		6.3	0.9	425	0	51	48	107	0.23	0.07	24	25	55.0	7.5	0.0	<1	601/602	UG/L	624	625
																	1,1DICHLOROETHANE	14	— 16	N.D.
																	TRANS12DICHLOROETHENE	4		
																	1,1DICHLOROETHENE	20		
																	TETRACHLOROETHENE	2		
																	1,1,1TRICHLOROETHANE	10	— 7	
																	TRICHLORETHENE	106	— 54	
CITY 1/20		7.1	0.3	100	0	34	13	22	0.07	0.01	0.7	11	20.0	1.5	0.00		601/602	UG/L	624	625
																	BROMODICHLOROMETHANE	16	— 17	N.D.
																	CHLORIFORM	98	— 100	
																	METHYLENENE CHLORIDE	2		
																	CHLORODIBROMOMETHANE		— 9	
R/O 30 PERMEATE 1/20		6.3	0.2	15	0	17	4	9	0.00	0.00	<0.5	<1	10.0	0.1	0.0					
R/O 30 REJECT STAGE 1 1/20		6.6	0.0	430	0	17	69	126	0.00	0.00	10	30	45.0	4.5	0.0					
AFTER DEGASIFIER 1/20	13																			
R/O 30 PRODUCT 1/20	4																			

Citrus
1.

625
N.D.

SAMPLE DATE:	BACT	FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA
WELL 1 1/20			5.9	0.0	440	0	34	64	122	0.00	0.68	12	23	22	4.1	0.0	1.6	601/602 — 624 — 625 VINYL CHLORIDE — 15 — N.D. TRANS12DICHLOROETHENE 33 — 19 111TRICHLOROETHANE 36 — 17 TRICHLOROETHENE 119 — 47 TETRACHLOROETHENE 2 — 2
WELL 2 1/20			6.4	0.0	125	0	17	15	29	0.04	1.40	8	14	11	2.0	0.0	1.8	601/602 N.D. — 624 N.D. — 625 N.D.

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WATER CONTROL LAB　　AT & T ANALYSIS　　2

SAMPLE DATE:	MICROBIOLOGY BACT	FUNGAL	MINERALS PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	ORGANICS TOC	VOA
INCOMING WATER 1/21	6	PENDING	6.0	0.0	400	0	17	52	110	0.02	0.68	35	22	20	3.7	0.0	1.6	601/602 UG/L TRANS12DICHLOROETHENE 34 111TRICHLOROETHANE 36 TRICHLOROETHENE 116 TETRACHLOROETHENE 1
R/O 28 FEED 1/21			6.4	0.0	400	0	17	57	116	0.00	0.00	12	46	20	4.0	0.0		601/602 UG/L — 624 — 625 111TRICHLOROETHANE 6 — N.D. — N.D.
R/O 28 REJECT 1/21	190	PENDING	6.6	0.0	1300	0	17	194	375	0.00	0.01	28	140	70	12.5	0.0		
R/O 28 PRODUCT 1/21	140	PENDING																
WELL 1 1/21			6.0	0.0	440	0	34	64	126	0.00	0.68	14	22	24	4.3	0.0	1.5	601/602 UG/L — 624 — 625 VINYL CHLORIDE — 25 — N.D. TRANS12DICHLOROETHENE 35 — 25 111TRICHLOROETHANE 37 — 31 TRICHLOROETHANE 126 — 55 TETRACHLOROETHENE 1 — 3
WELL 2 1/21			6.3	0.0	125	0	17	15	30	0.02	136	8	15	11	1.8	0.0	1.7	601/602 UG/L N.D. — 624 N.D. — 625 N.D.
WELL 3 1/21			6.3	0.6	400	0	51	41	102	0.20	0.07	20	26	35	7.0	0.0	(1	601/602 UG/L — 624 — 625 11DICHLOROETHENE 21 — 13 — N.D. 11DICHLOROETHANE 14 — 3 TRANS12DICHLOROETHENE 4 — 14 111TRICHLOROETHANE 18 — 41 TETRACHLOROETHENE — 2 TRICHLOROETHENE 91
CITY			6.7	0.2	100	0	17	10	22	0.07	0.01	0.7	12	10	2.0	0.16		601/602 UG/L — 624 — 625

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APPENDIX II (CONTINUED)

R/1 TREAT 0.0 7 00 7 0.0

	BACT	FUNGAL	PH	TURB	COND	P ALK	M ALK	SODIUM	CL-	FE	MN	SILICA	SULFATE	CA	MG	CHLORINE	TOC	VOA			
R/O 28 REJECT STAGE 1 1/21			6.0	0.0	800	0	17	110	217	0.00	0.00	22	80	40	7.0	0.0					
CARBON A IN 1/21																	1.3		UG/L		625 N.D.
CARBON A OUT 1/21																	(1		UG/L		625 N.D.
INCOMING WATER 1/22	14	PENDING	6.2	0.2	375	0	34	51	102	0.00	0.74	14	22	15	3.7	0.0	1.6	601/602	UG/L		
																		11DICHLOROETHANE	11		
																		11DICHLOROETHENE	13		
																		TRANS12DICHLOROETHENE	4		
																		TETRACHLOROETHENE	1		
																		111TRICHLOROETHANE	14		
																		TRICHLOROETHENE	89		
AFTER DEGASIFIER 1/22	0	PENDING																			
R/O 29 FEED 1/22			6.5	0.1	375	0	17	53	109	0.00	0.00	14	34	13	3.2	0.0		601/602/	UG/L	624	625
																		111TRICHLOROETHANE	6	N.D.	N.D.
R/O 29 REJECT 1/22	250	PENDING	6.8	0.0	1600	0	17	206	429	0.00	0.00	36	145	60	13.5	0.0					
R/O 29 PRODUCT 1/22	9	PENDING																			
CARBON A IN 1/22																	1.3		UG/L		625 N.D.
CARBON A OUT 1/22																	(1				
WELL 1 1/22			6.4	0.1	450	0	34	61	121	0.01	0.64	14	22	15	3.6	0.0	1.6	601/602	UG/L		
																		11DICHLOROETHANE	4		
																		TRANS12DICHLOROETHENE	33		
																		111TRICHLOROETHANE	33		
																		TRICHLOROETHENE	119		
WELL 2 1/22			6.6	0.0	150	0	17	16	31	0.00	1.10	10	14	7	1.0	0.0	1.3	601/602	UG/L	?	
																		N.D.			
WELL 3 1/22			6.5	0.1	425	0	51	37	100	1.07	0.07	[illegible]	[illegible]	[illegible]	7	0.0	(1	601/602	UG/L		
																		[illegible]			

REVERSED ORDER??

APPENDIX II (CONTINUED)

CITY 1/22	7.2	0.1	100	0	17	10	[illegible]	0.02	0.00	0.9	12	6	1.7	0.1
R/O 29 PERMEATE 1/22	6.7	0.0	25	0	17	3	4	0.00	0.00	0.8	(1	0.4	0.1	0.0
R/O 29 REJECT STAGE 1 1/22	6.6	0.0	825	0	17	111	150	0.00	0.00	26	85	30	6.5	0

[illegible] TRICHLOROETHENE 56

601/602 UG/L
CHLOROFORM 115
BROMODICHLOROMETHANE 17

WATER CONTROL LAB

AT & T ANALYSIS

TOTAL BACTERIA RESULTS (COLONIES /1ML)

SAMPLE	DATES: 2/4/86	2/5/86	2/6/86	2/7/86
A CARBON BED OUT	36	50	67	46
B CARBON BED OUT	)2000	)2000	115	60
C CARBON BED OUT	)2000	)2000	270	36
D CARBON BED OUT	1200	)2000	170	53
R/O 28 BANKS OUT	28	27	107	30
R/O 29 BANKS OUT	85	200	20	20
R/O 30 BANKS OUT	60	110	65	34
DEGASSIFIER IN	1360	NO SAMPLE	13	9
DEGASSIFIER OUT	2	0	3	15
MIXED BED OUT	1100	270	0	1
FILTERED TANK OUT	0	NO SAMPLE	0	0
A SINK	75	110	230	300
2 BEDS OUT -	870	1900	92	150
FILTERED WATER ONLY	NO SAMPLE	NO SAMPLE	0	5

VOA 601/602 RESULTS (UG/L)

SAMPLE DATE	601	UG/L	602	UG/L
INCOMING 2/4/86	1,1DICHLOROETHANE	1	[illegible]	6
	1,1DICHLOROETHENE	4	[illegible]	6

[illegible] 1/86	[illegible]		[illegible]
	TRANS12D[illegible]ETHENE	[illegible]	[illegible]
	111TRICHLOROETHANE	3	chloro Benzene 2
	TRICHLOROETHENE	19	
CARBON OUT 2/4/86	NONE DETECTED		N.D.
INCOMING 2/5/86	1,1DICHLOROETHENE	9	Benzene 17
	TRANS12DICHLOROETHENE	18	
	TETRACHLOROETHENE	1	
	111TRICHLOROETHANE	30	
	TRICHLOROETHENE	29	
CARBON IN 2/5/86	BROMODICHLOROMETHANE	4	Benzene 9
	CHLOROFORM	3	Toluene 2
	TRANS12DICHLOROETHENE	4	
	METHYLENE CHLORIDE	1	
	111TRICHLOROETHANE	9	
	TRICHLOROETHENE	6	
CARBON OUT 2/5/86	NONE DETECTED		N.D
INCOMING 2/6/86	1,1DICHLOROETHENE	9	Benzene 14
	TRANS12DICHLOROETHENE	14	Ethyl Benzene 1
	TETRACHLOROETHENE	1	
	111TRICHLOROETHANE	27	
	TRICHLOROETHENE	24	
CARBON IN 2/6/86	1,1DICHLOROETHENE	1	Benzene 5
	TRANS12DICHLOROETHENE	3	Ethyl Benzene 1
	111TRICHLOROETHANE	4	Chloro Benzene 2
CARBON OUT 2/6/86	111TRICHLOROETHANE	6	N.D
INCOMING 2/7/86	1,1DICHLOROETHENE	6	Benzene 7
	TRANS12DICHLOROETHENE	8	
	TETRACHLOROETHENE	1	
	111TRICHLOROETHANE	17	
	TRICHLOROETHENE	15	
CARBON IN 2/7/86	BROMODICHLOROMETHANE	7	Benzene 5
	CHLOROFORM	3	Toluene 1
	1,1DICHLOROETHENE	1	Ethyl Benzene 5
	TRANS12DICHLOROETHENE	4	[illegible]
	111TRICHLOROETHANE	10	

SITE 1: THE TANK FARM

ORGANIC VAPOR SCREENING DATA

Tank Area	Boring Number	Depth (ft)	HNU READINGS (ppm)
Site 1	P3-B1	0- 2.0	0
		2- 4.0	–
		4- 6.0	0
		6- 8.0	0
		8-10.0	0
	P3-B2	0- 2.0	3.0- 5.0
		2- 4.0	0.0-20.0
		4- 6.0	1.0- 1.5
		6- 8.0	3.0- 5.0
		8-10.0	10.0-15.0
		10-10.5	–
	P3-B3	0- 2.0	0
		2- 4.0	0
		4- 6.0	0
		6- 8.0	0
		8-10.0	0.0- 0.1
		10-12.0	0
		12-12.5	0
	P3-B2	0- 6.0	–
		6- 8.0	0
		8-10.0	0
		10-12.0	0.0- 0.5
		12-13.5	0

The highest concentrations of organic vapors detected was 20 ppm using the HNu.

One soil sample from the area that exhibited the most contamination in the field was submitted for laboratory analysis. Results of extended Method 624 analysis indicated concentrations of volatile organics in the soil totalling less than 25 ppb. It is evidenced in this case, and is confirmed by past experience, that organic vapor concentrations measured in the field can be orders of magnitude greater than concentrations in the soil as measured in the laboratory.

SITE 2: THE GASOLINE FILL STATION

The soil sampled and screened in the field from three borings encircling the gasoline tank demonstrated no significant contamination in the unsaturated zone.

SITE 2: GASOLINE FILL STATION
ORGANIC VAPOR SCREENING DATA

Tank Area	Boring Number	Depth (ft)	HNU READINGS (ppm)
Site 2	P2-B1	0- 6.0	-
		6- 8.0	0
		8-10.0	0
		10-12.0	0
		12-14.0	0
	P2-B2	0- 1.0	-
		1- 4.0	0
		4- 6.0	0
		6- 8.0	0
		8-10.0	0
		10-11.5	0
	P2-B3	0- 1.0	-
		1- 4.0	-
		4- 6.0	0
		6- 8.0	0
		8-10.0	0
		10-12.0	0
		12-18.0	0

SITE 3: THE WASTE ACETONE TANK

Significant levels of acetone were detected in the soil around the waste acetone tank. In one boring, the HNu read up to 500 ppm (peak value). The results are tabulated below:

SITE 3: WASTE ACETONE TANK
ORGANIC VAPOR SCREENING DATA

Tank Area	Boring Number	Depth (ft)	HNU READINGS (ppm)
Site 1	W2-B1	0- 2.0	0
		2- 4.0	0
		4- 6.0	0
		6- 8.0	10.0- 40.0
		8-10.0	0
		10-12.0	40.0- 50.0
		12-14.0	0.0-300.0
		14-16.0	50.0-500.0
		16-18.0	150.0-200.0
		18-20.0	50.0
	W2-B2	0- 2.0	0
		2- 4.0	0
		4- 6.0	0
		6- 8.0	0
		8-10.0	0.0- 15.0
		10-12.0	5.0- 10.0
		12-14.0	0.0- 7.0
		14-16.0	5.0- 15.0

APPENDIX IV

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TABLE 2

VOLATILE ORGANIC CONCENTRATIONS IN GROUNDWATER

May - June 1987

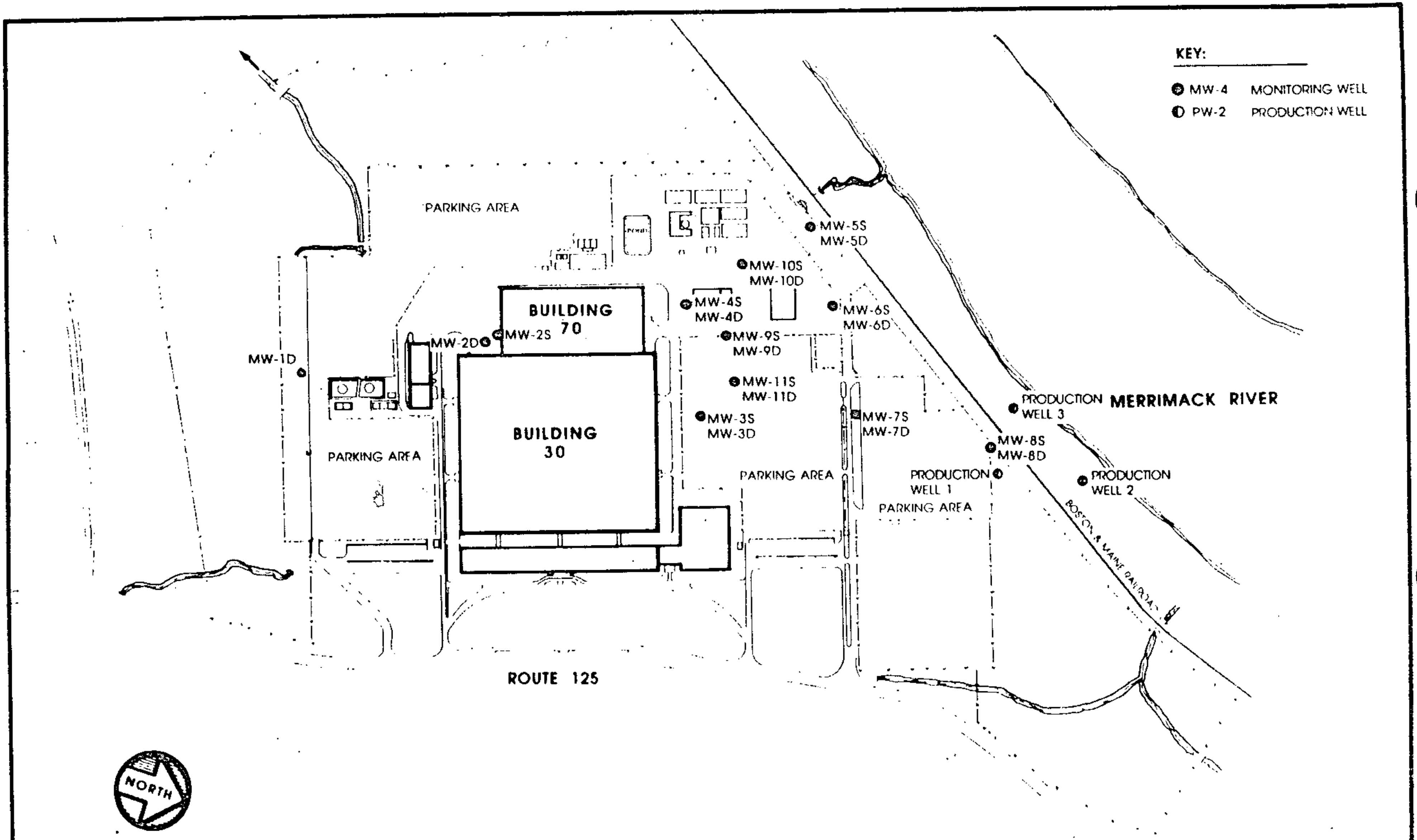
WELL ID	1D	2S	2D	3S	3D	4S	4D	5S	5D	6S	6D	7S	7D	8S	8D	9S	9D	10S	10D	11S	11D	PW1	PW2	PW
DETECTION LIMIT (ppb)	1 to 5	10000	10	25	10	10	10	1 to 5	10	10	50	1 to 5	10	10	1 to 5	10	10	25	10	10	10	1 to 5	1 to 5	10
CHLOROMETHANE																								
BROMOMETHANE																								
VINYL CHLORIDE						438												60	498					
CHLOROETHANE																								
METHYLENE CHLORIDE																								
TRICHLOROFLUOROMETHANE																								
1, 1-DICHLOROETHYLENE				73		36		4.6			135													
1, 1-DICHLOROETHANE			11		36	39		2.5	11		218						24	25	21					
TRANS-1, 2-DICHLOROETHYLENE						73		12			120			12				355	274				10	
CHLOROFORM													30			11								
1, 2-DICHLOROETHANE																								
1, 1, 1-TRICHLOROETHANE		47,200	14	468						39				12			21	28					8	
CARBON TETRACHLORIDE																								
BROMODICHLOROMETHANE																								
1, 2-DICHLOROPROPANE																								
TRANS-1 3-DICHLOROPROPENE																								
TRICHLOROETHYLENE		67,330	47	198		91			16		595			22		87	25	215	102	95			57	41
DIBROMOCHLOROMETHANE																								
CIS-1, 3-DICHLOROPROPENE																								
1, 1, 2-TRICHLOROETHANE																								
BENZENE																								
2-CHLOROETHYLVINYLETHER																								
BROMOFORM																								
1, 1, 2, 2-TETRACHLOROETHYLENE				30													11							
1, 1, 2, 2-TETRACHLOROETHANE																								
TOLUENE		94,170																						
CHLOROBENZENE																								
ETHYLBENZENE																								
TOTAL VOLATILES	ND	208,700	72	769	36	677	ND	19	27	39	1068	ND	30	46	ND	98	81	683	895	95	ND	ND	75	41

EPA methods 601 ; 602 or 624 Analysis

UNDERGROUND STORAGE TANKS AT THE MERRIMACK VALLEY WORKS

TANK LOCATION[1]	TANK CONTENTS	TANK STATUS
	NEW PRODUCTS:	
1	AMMONIA ETCHANT	IN USE; TO BE REMOVED IN 1988.
2	GASOLINE*	REMOVED AND REPLACED WITH A NEW UNDERGROUND TANK IN 1986.
2	DIESEL	INSTALLED IN 1986.
3	METHYL CHLOROFORM*	REMOVED IN 1986-87.
3	METHYL CHLOROFORM*	REMOVED IN 1986-87.
3	METHYL CHLOROFORM*	REMOVED IN 1986-87.
3	TRICHLOROETHENE*	REMOVED IN 1986-87.
3	ACETONE*	REMOVED IN 1986-87.
3	ACETONE*	REMOVED IN 1986-87.
3	TOLUENE*	REMOVED IN 1986-87.
3	VARSOL*	REMOVED IN 1986-87.
3	VARSOL*	REMOVED IN 1986-87.
4	CAUSTIC SODA	REMOVED IN 1985.
4	CAUSTIC SODA	REMOVED IN 1985.
	WASTE PRODUCTS:	
1	SPENT AMMONIA ETCHANT	IN USE; TO BE REMOVED IN 1988.
1	SPENT AMMONIA ETCHANT	IN USE; TO BE REMOVED IN 1988.
1	BRULIN	IN USE; TO BE REMOVED IN 1988.
1	SPENT ELECTROLESS COPPER PLATING SOLUTION	IN USE; TO BE REMOVED IN 1988.
4	GENERAL WASTE	REMOVED IN 1985.
4	CONCENTRATED CYANIDE WASTE	REMOVED IN 1985.
5	WASTE SOLVENT*	REMOVED IN 1986.
6	WATER AND ACETONE*	CLEANED, FILLED WITH GROUT IN 1986.
6	SPILL-RUNOFF OF FLAMMABLE MATERIAL IN BLDG. 34.	IN USE.
7	WASTE MINERAL OIL*	REMOVED IN 1987.
8	WASTE OIL*	REMOVED IN 1987.
8	NO. 6 FEUL OIL ("DAY TANK")	IN USE.
8	ETHYLENE GLYCOL	OUT OF USE.; TO BE REMOVED IN 1988.

* THESE TANKS WERE REMOVED / FILLED WITH GROUT WITH THE ASSISTANCE OF CDM IN PHASE II.



AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION
FIGURE 4-1
WELL LOCATIONS

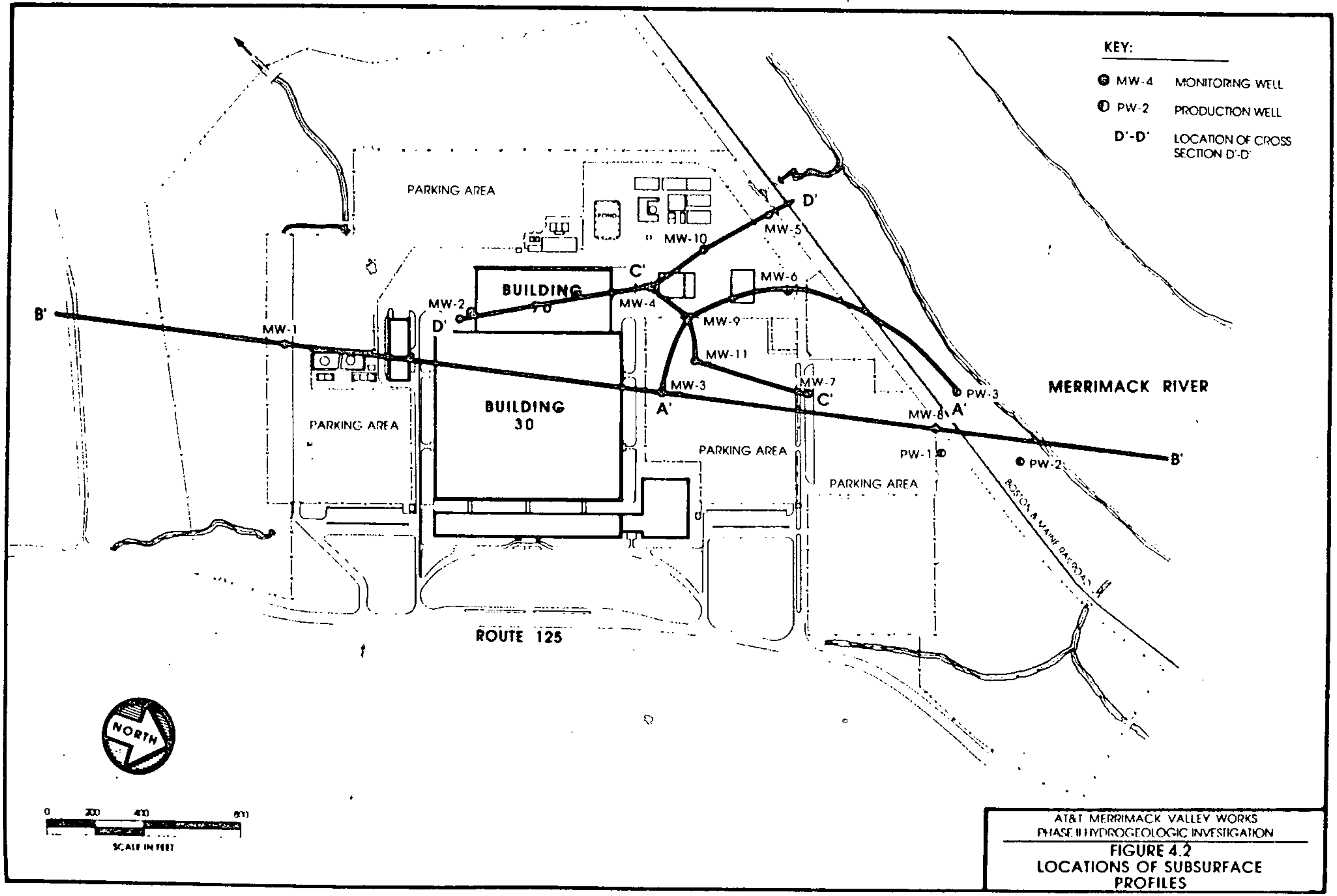
TABLE 4-1

MONITORING WELL CONSTRUCTION DATA

WELL I.D.	DATE INSTALLED	ELEVATION OF WELL TOP (FT,MSL)	SCREEN ELEV TOP (FT, MSL)	SCREEN ELEV BOTTOM (FT, MSL)	WELL DIAM. (IN)	BORING DIAM. (IN)	FORMATION SCREENED
SHALLOW WELLS							
MW - 2S	5/20/86	43.30	28	18	2	6	SA
MW - 3S	5/22/86	47.66	29	19	2	6	SA
MW - 4S	5/21/86	43.38	21	11	2	6	SA
MW - 5S	5/27/87	31.40	14	9	4	13	SA
MW - 6S	7/ 1/86	39.80	10	0	4	6	SA
MW - 7S	5/23/86	42.44	18	13	2	6	SA
MW - 8S	5/28/86	31.26	5	-5	2	6	SA
MW - 9S	5/21/87	42.79	15	5	4	13	SA
MW - 10S	5/18/87	33.03	25	20	4	13	SA
MW - 11S	5/20/87	45.49	16	11	4	13	SA
DEEP WELLS							
MW - 1D	6/27/86	46.80	-42	-52	4	6	BR
MW - 2D	6/18/86	42.94	-39	-49	4	6	BR
MW - 3D	6/17/86	47.30	-28	-38	4	6	BC
MW - 4D	6/24/86	42.88	-66	-76	4	6	BR
MW - 5D	6/24/86	31.19	-79	-89	4	6	BR
MW - 6D	6/30/86	39.48	-56	-66	4	6	BC-BR
MW - 7D	6/20/86	42.07	-67	-77	4	6	BR
MW - 8D	5/19/86	31.28	-50	-70	2	6	BR
MW - 9D	5/19/87	43.03	-45	-55	4	6	BC
MW - 10D	5/21/87	33.16	-25	-35	4	6	BR
MW - 11D	5/26/87	45.45	-24	-39	4	6	BC

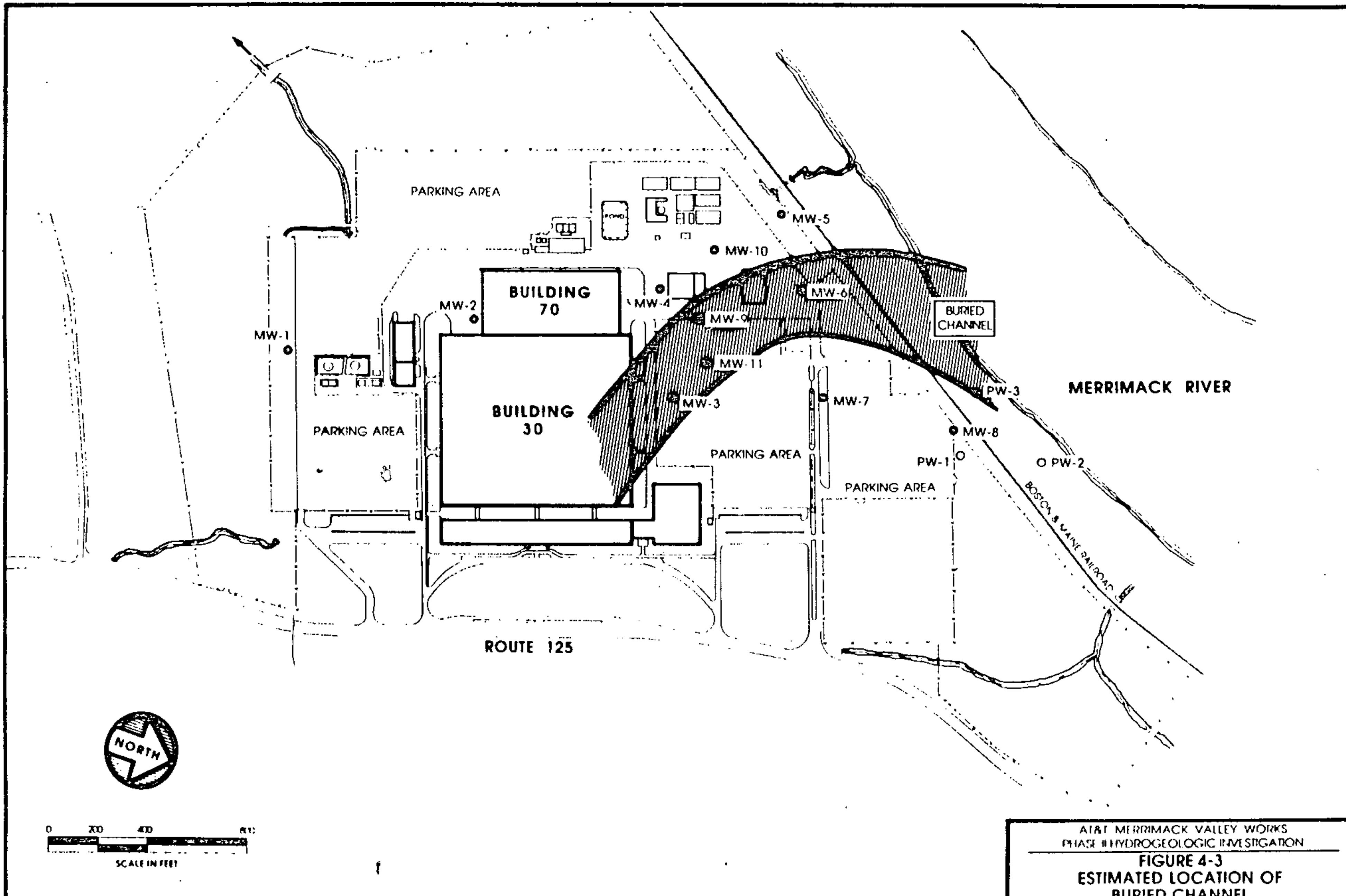
KEY:

BR = WEATHERED BEDROCK
BC = BURIED CHANNEL
SA = SURFICIAL FINE SAND



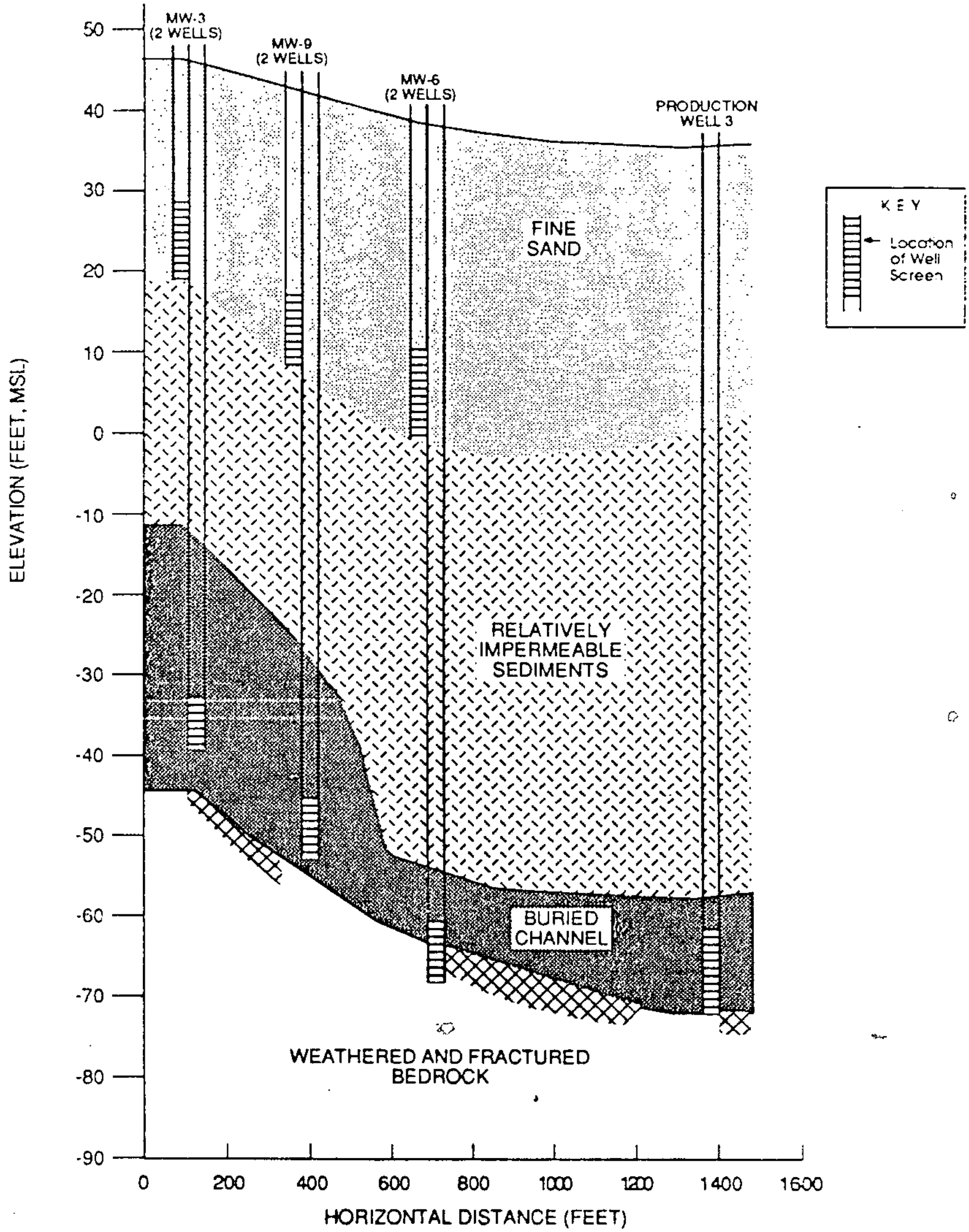
AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION

FIGURE 4.2
LOCATIONS OF SUBSURFACE PROFILES

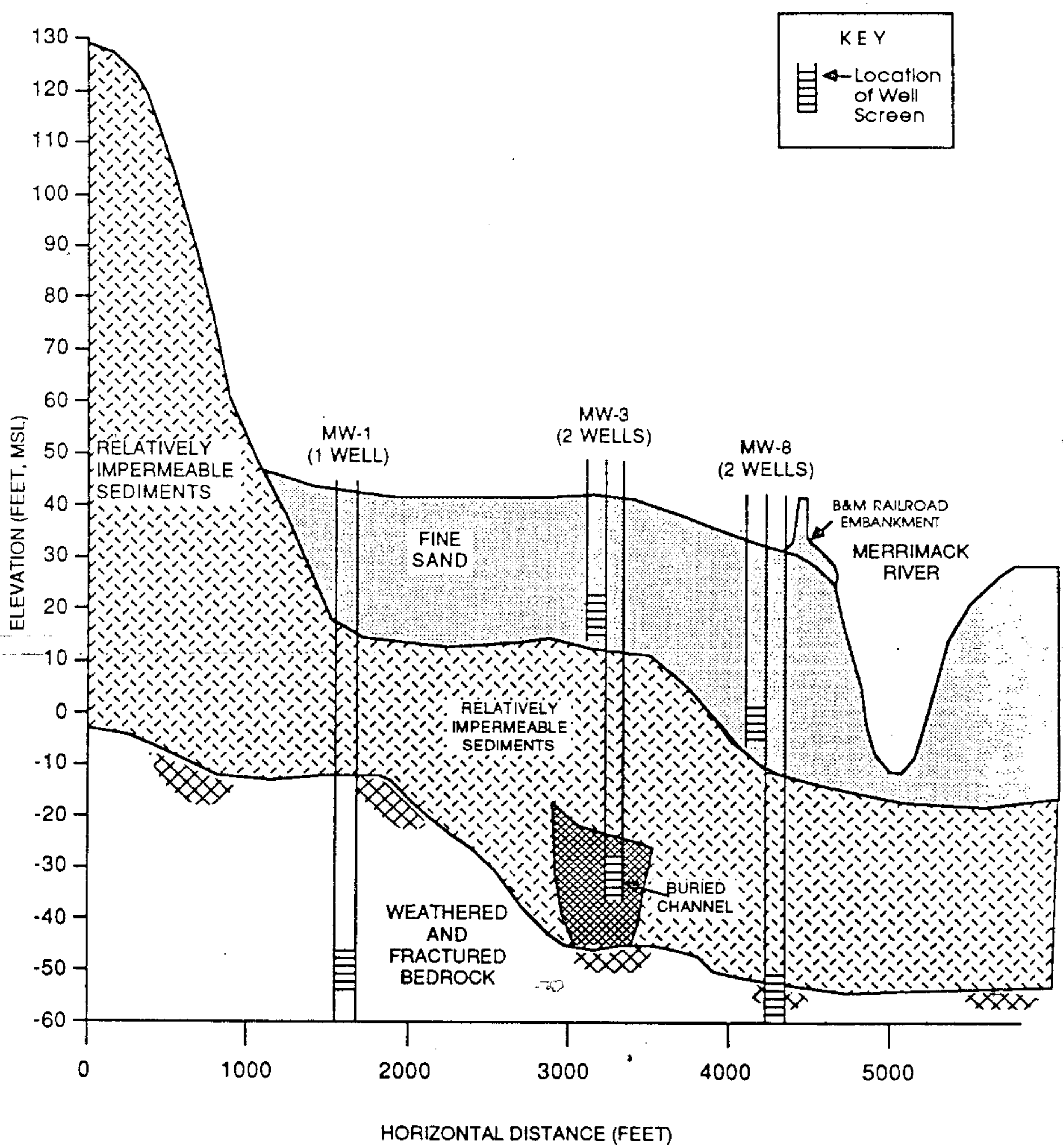


AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION

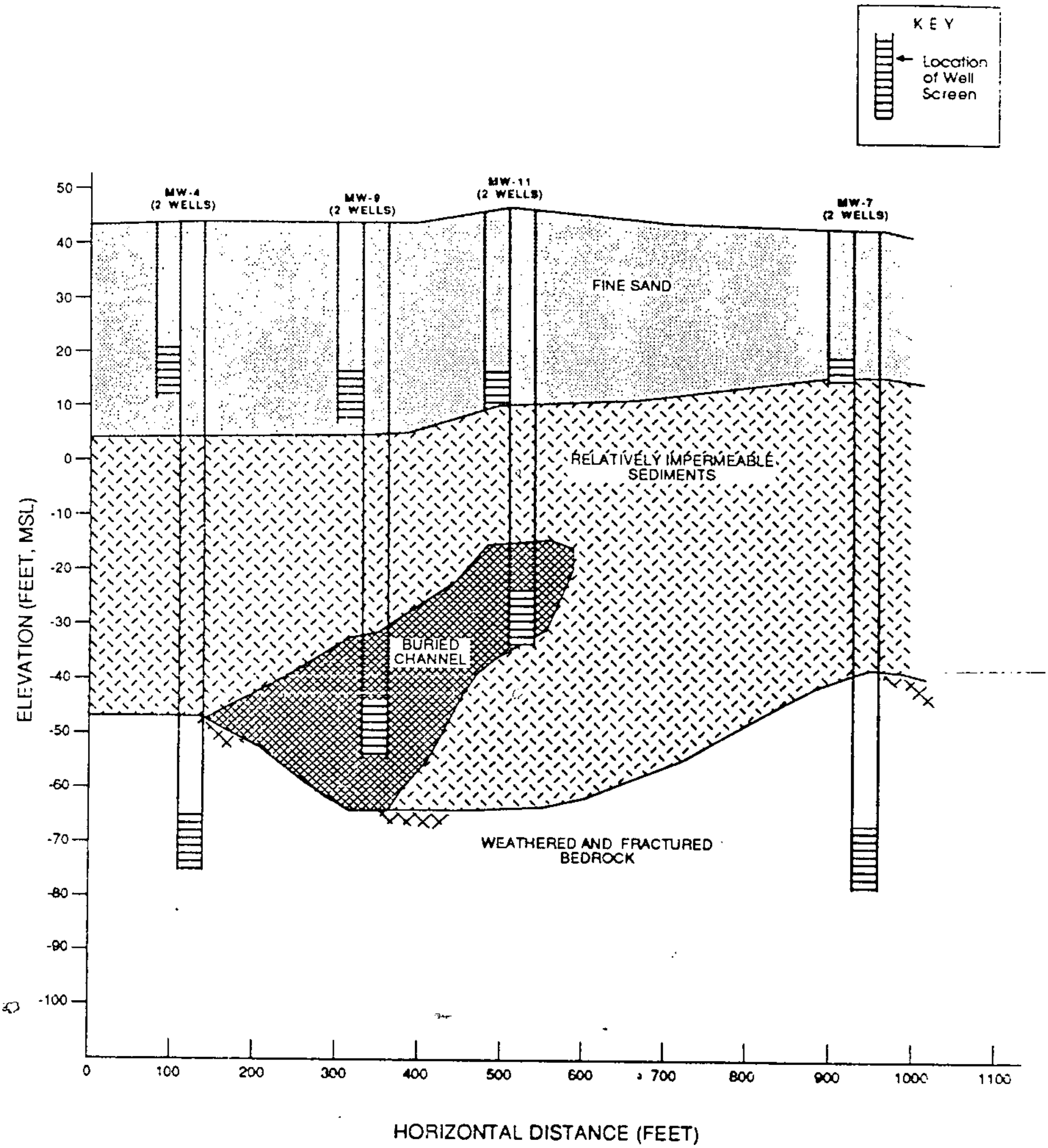
FIGURE 4-3
ESTIMATED LOCATION OF
BURIED CHANNEL



AT&T MERRIMACK VALLEY WORKS PHASE II HYDROGEOLOGIC INVESTIGATION Camp Dresser & McKee Inc.	FIGURE 4-4 SUBSURFACE PROFILE: SECTION A' - A'



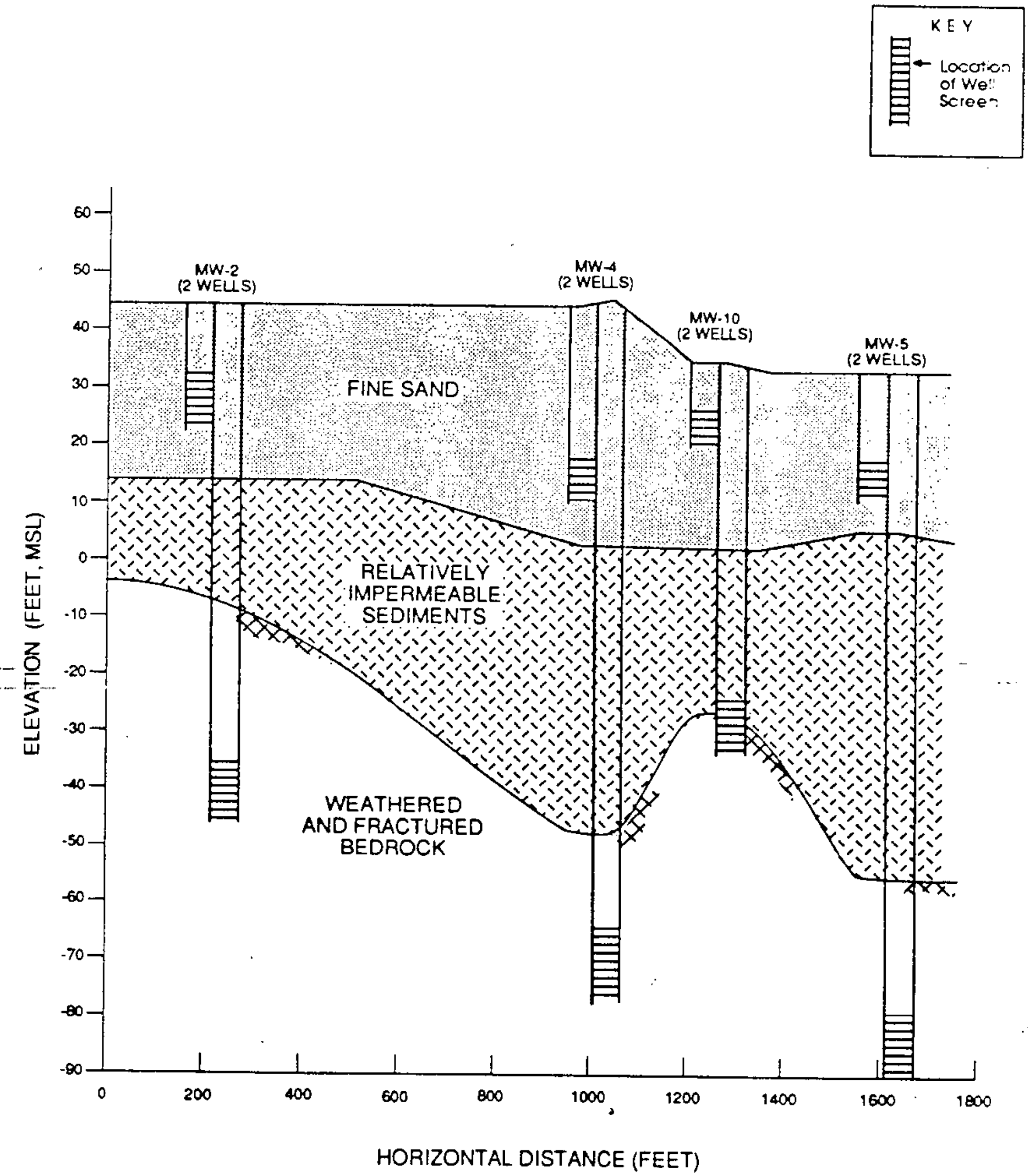
AT&T MERRIMACK VALLEY WORKS PHASE II HYDROGEOLOGIC INVESTIGATION Camp Dresser & McKee Inc.	FIGURE 4-5 SUBSURFACE PROFILE: SECTION B' - B'



AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION

Camp Dresser & McKee Inc.

FIGURE 4-6
SUBSURFACE PROFILE: SECTION C' - C'



AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC
INVESTIGATION

Camp Dresser & McKee Inc.

FIGURE 4-7
SUBSURFACE PROFILE: SECTION D' - D'

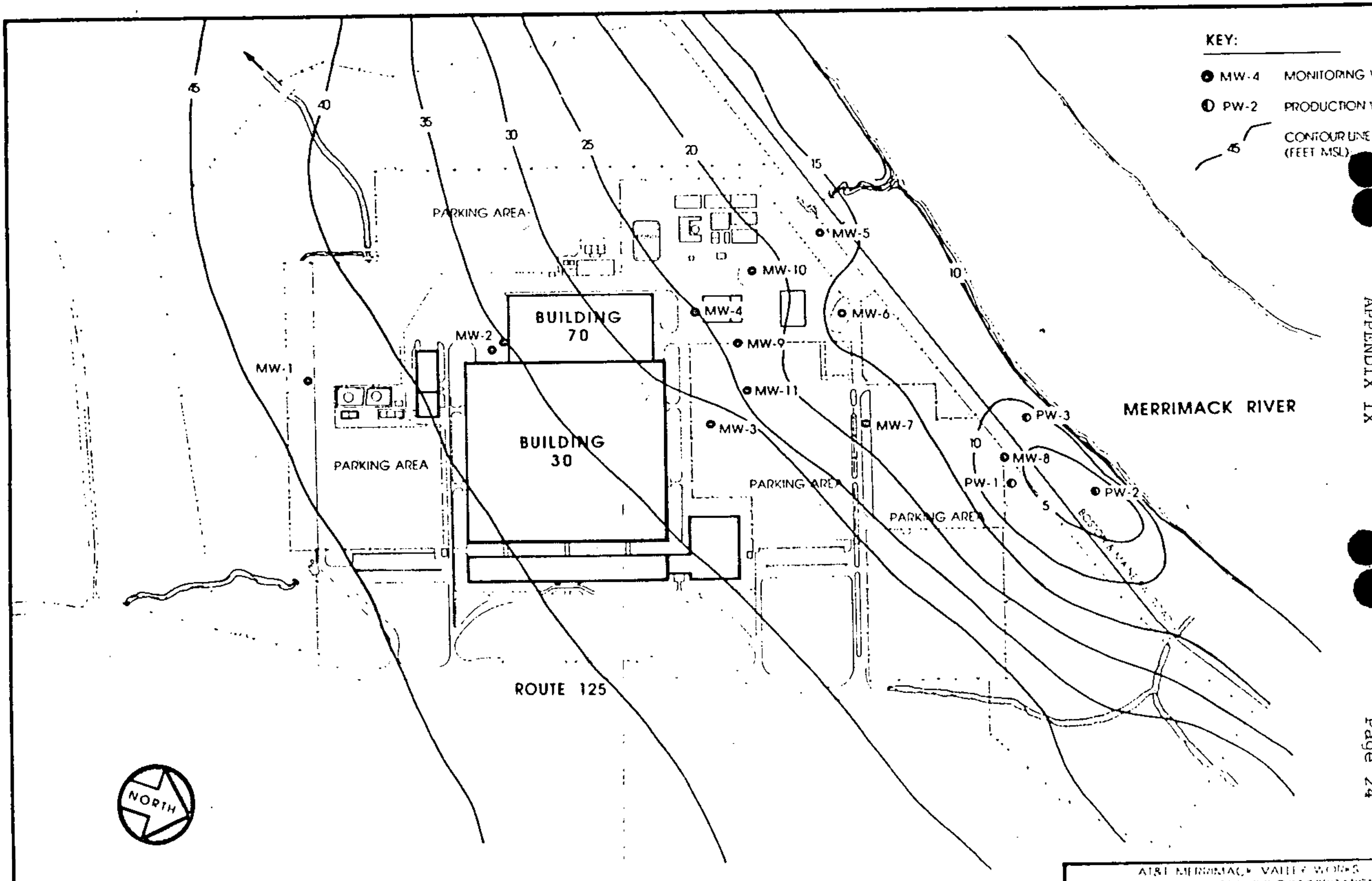
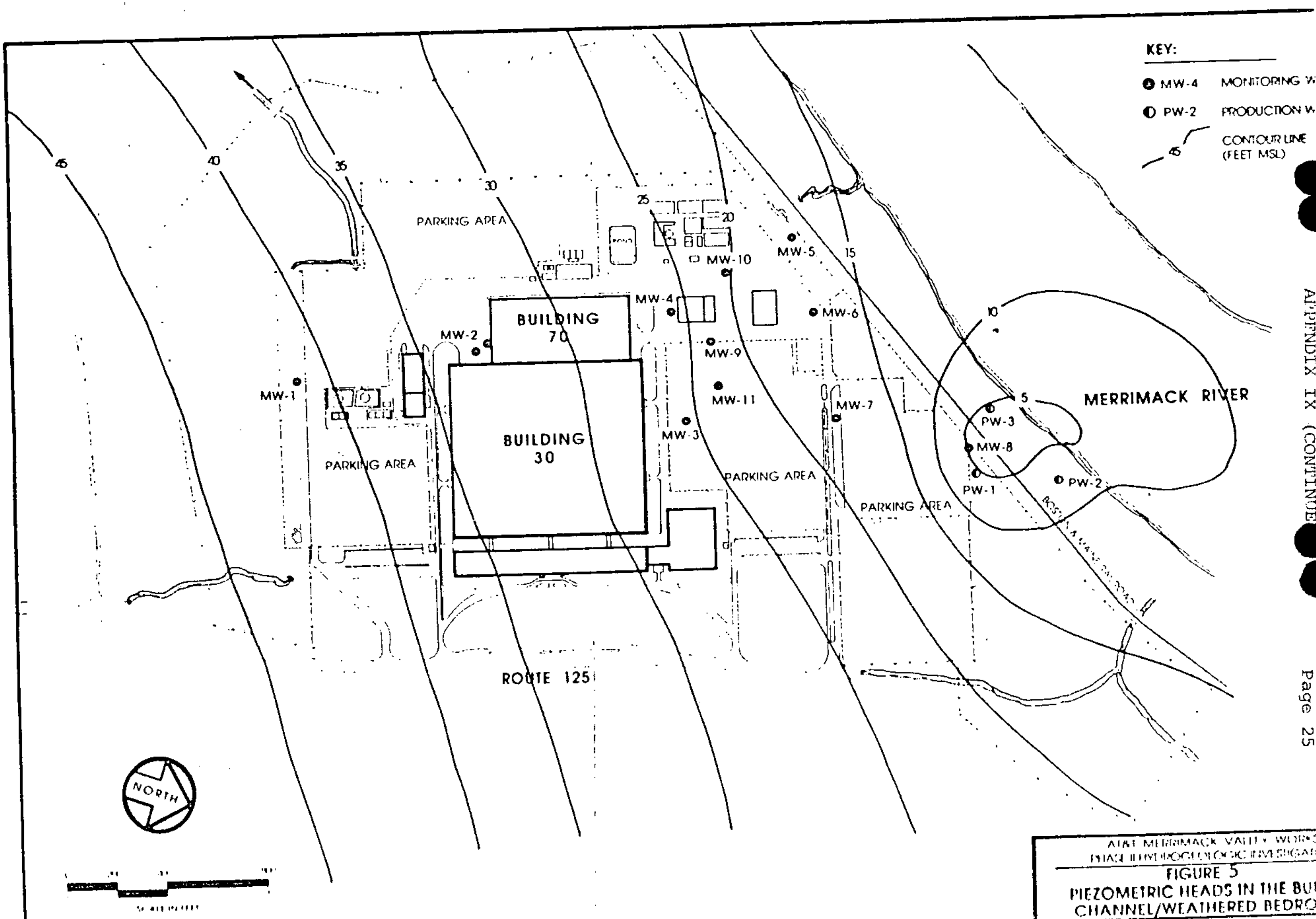
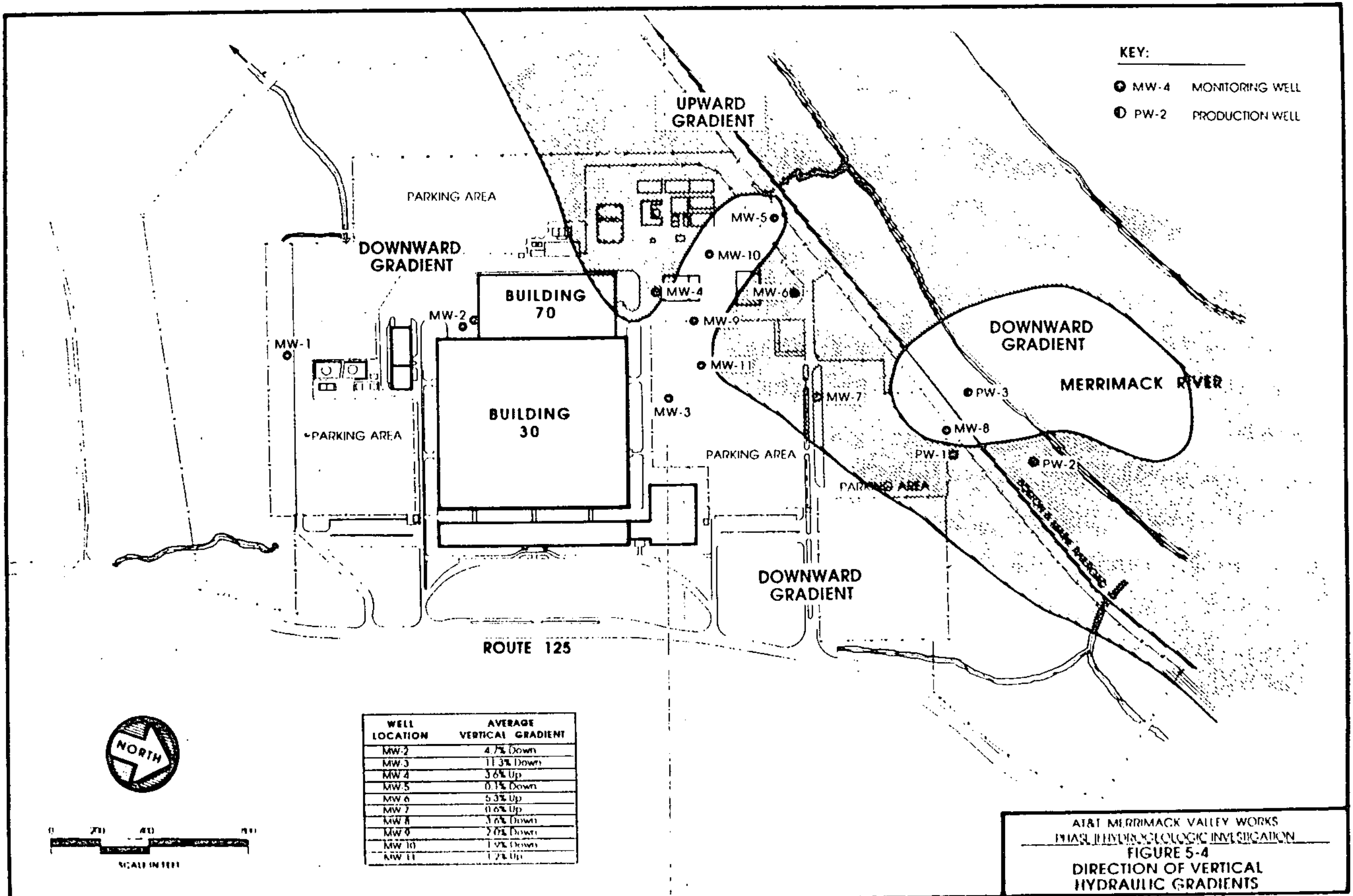


FIGURE 4
PIEZOMETRIC HEADS IN THE SHALLOW SAND (WATER TABLE)



AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATI

FIGURE 5
PIEZOMETRIC HEADS IN THE BUR
CHANNEL/WEATHERED BEDRO



WELL LOCATION	AVERAGE VERTICAL GRADIENT
MW-2	4.7% Down
MW-3	11.3% Down
MW-4	3.6% Up
MW-5	0.1% Down
MW-6	5.3% Up
MW-7	0.6% Up
MW-8	3.6% Down
MW-9	2.0% Down
MW-10	1.9% Down
MW-11	1.7% Up

AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION
FIGURE 5-4
DIRECTION OF VERTICAL HYDRAULIC GRADIENTS

TABLE 5-1

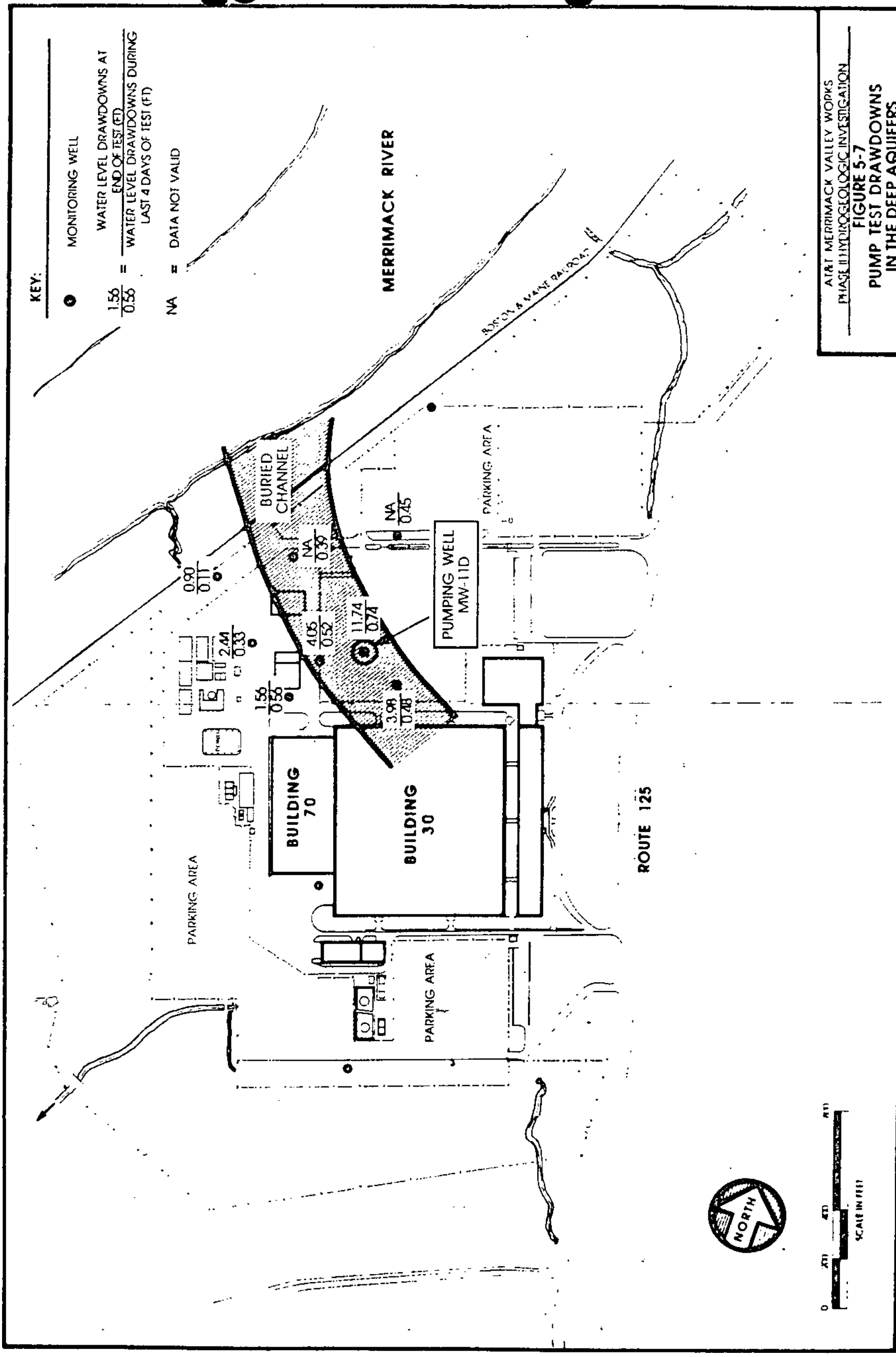
CHLORIDE CONCENTRATIONS IN GROUNDWATER

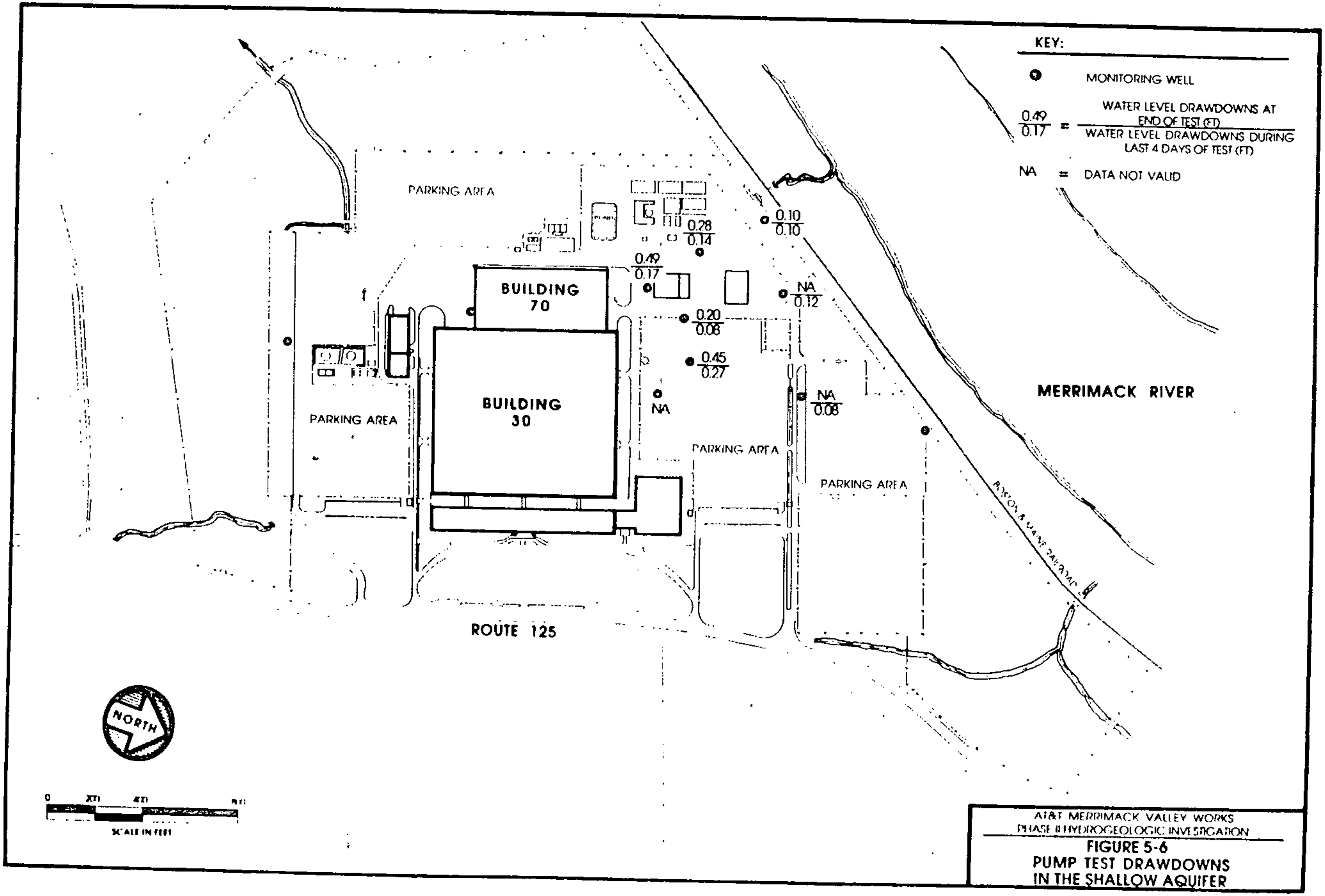
SAMPLING TIME(2)	CHLORIDE CONCENTRATION (mg/l) SURFICIAL FINE SAND	BURIED CHANNEL	DEEP TRANSITION(1)	WEATHERED BEDROCK
SUMMER 1986				
RANGE	67 - 2700	100 - 350	-	2.3 - 7.5
AVERAGE	726	197	43	5.1
SUMMER 1987				
RANGE	46 - 2600	110 - 550	55 - 500	2.4 - 25
AVERAGE	900	246	278	10.3

NOTES:

(1) Monitoring Wells MW-5D and MW-10D are referred to as Deep Transition wells because they are screened in bedrock, but have chloride concentrations more typcial of the buried channel.

(2) All wells installed in 1986, and the three production wells, were analyzed for chlorides in the summer of 1986. All wells installed in 1986 and 1987, and the production wells, were sampled and analyzed for chlorides in the Summer of 1987, with the exception of MW-2S and MW-2D. See Table 4-1 for monitoring well installation dates.


KEY:
MONITORING WELL
1.56 / 0.56 = WATER LEVEL DRAWDOWNS AT END OF TEST (FT) / WATER LEVEL DRAWDOWNS DURING LAST 4 DAYS OF TEST (FT)
NA = DATA NOT VALID
MERRIMACK RIVER
BOSTON & MAINE RAILROAD
BURIED CHANNEL
PUMPING WELL MW-11D
0.90 / 0.11
2.44 / 0.33
1.56 / 0.56
4.06 / 0.52
11.74 / 0.74
3.98 / 0.48
NA / 0.39
NA / 0.45
PARKING AREA
PARKING AREA
PARKING AREA
BUILDING 70
BUILDING 30
ROUTE 125
NORTH
SCALE IN FEET
AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION
FIGURE 5-7
PUMP TEST DRAWDOWNS IN THE DEEP AQUIFERS



AT&T MERRIMACK VALLEY WORKS
PHASE II HYDROGEOLOGIC INVESTIGATION
FIGURE 5-6
PUMP TEST DRAWDOWNS
IN THE SHALLOW AQUIFER

TABLE 5-2

RESULTS OF BOREHOLE PERMEABILITY TESTS

FORMATION	HYDRAULIC CONDUCTIVITY (FT / DAY) RANGE	AVERAGE
SURFICIAL FINE SAND	0.1 - 8.9	3
BURIED CHANNEL	7.5 - 22.6	17
WEATHERED BEDROCK	0.2 - 3.0	1

MAD982547317

AT&T , North Andover

MA DEQE/PA 9/29/88

current status N - RCRATSDF

4/26/90 [signature]